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ABSTRACT

This paper presents data bearing on the question of the effects of crowding on indices of stress and on one's perception of being crowded. A palmar sweat measure of stress was employed to examine inmate stress in relation to social and spacial density factors. The data suggest that increasing the number of people in a housing unit (and hence the potential number of interactions) leads to increases in levels of stress as measured by palmar sweat. In contrast, decreasing the amount of space per man does not lead to such increases in levels of stress. Apparently the social component of crowding appears to be the more important variable in producing crowding stress. The authors also employed a figure placement task developed by Desor to assess the degree to which the inmates tolerate stress. The figure placement data suggest that individuals living under relatively high levels of social density develop greater tolerance for crowding than those living under lower levels of social density. This finding is in agreement with an adaptation level theory analysis of responsitivity to stress. (SJL)

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PERCEIVED CROWDEDNESS IN A PRISON ENVIORNMENT

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The previous paper has outlined the aims of our program and an initial attempt to assess any potential stressful effects of crowding. The present paper will present additional data bearing on the question of the effects of crowding on indices of stress and on one's perception of being crowded. Some of this data was gathered during a second testing session at the Texarkana Federal Correctional Institution.

One of our goals for this second session was to obtain a more direct and simplified measure of stress. The effectiveness of the adjective checklist technique depends on the capability of the inmates to verbalize their emotional states as well as their willingness to make their feelings public. The failure to find any effects of crowding on this measure may be due to a failure to meet these conditions with our subject population. To overcome the problem we employed a palmar sweat measure of stress. This measure involves the application of a solution to the finger tip. This solution dries within 20 seconds and can be lifted from the finger with transparent tape and placed on a microscope slide. This print is examined with a microprojector which reveals active sweat glands as holes along the ridges of the fingerprint. The number of holes in a 4 mm square area is employed as the palmar sweat index. This measure has been employed in a number of different contexts as a measure of arousal or anxiety due to such stressors as spectator presence, flight, and surgery, and is generally considered as providing similar information as the GSR.

Two palmar sweat prints were obtained from 46 inmates volunteers at the

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Texarkana Federal Correctional Institution. The data from some of the inmates were not employed either because the information regarding their conditions of housing was incomplete or because they had only recently arrived at the institution and were still going through orientation. The average number of open pores on the two prints were taken as the palmar sweat measure of stress.

The palmar sweat scores of the inmates were analyzed for correlation with their social and spatial density scores. Again, social density is defined as the number of potential dyadic interactions in a housing unit. Spatial density is defined as the number of square feet per man in the unit. Social density was found to be positively correlated with the palmar sweat scores ($r = .35$, $df = 44$, p .05). That is, the higher the social density index of the inmate, the higher his palmar sweat score. Even though spatial and social density were significantly correlated ($r = .55$, $df = 44$, p .001), spatial density was unrelated to the palmar sweat scores ($r = -.06$). Futhermore, the total number of days in confinement was not significantly related to the palmar sweat measure ($r = -.08$) even though this measure was correlated with both social and spatial density (w/social, $r = -.44$, $df = 44$, p .01; w/spatial, $r = -.28$, $df = 44$, p .10).

Let me put these data in perspective for a moment. These results suggest that the increasing the number of people in a housing unit (and hence the potential number of interactions) appears to lead to increases in levels of stress as measured by palmar sweat. In contrast, decreasing the amount of space per man does not lead to such increases in levels of stress. Apparently the social component of crowding appears to be the more important variable in producing crowding stress. If this effect holds in further studies, it suggests that any potentially deleterious effects of corwding in prisons may

be lessened by having more housing units with smaller numbers of inmates, even though this may result in less space per man.

Although the palmar sweat data has shown that inmates with relatively high levels of social density have higher stress levels than inmates living under lower levels of social density, it remains possible that some degree of adaptation is occurring. That is, inmates living under highly corwded conditions may develop a greater tolerance for crowding than those living under less crowded conditions. This increased tolerance need not completely eliminate their stress reactions to the environment, althouth it may lessen their intensity. In contrast, one could of course also argue that being crowded produces less tolerance for crowding or a need for less crowded environments.

The degree to which the inmates tolerate crowding was assessed using a task employed in a recent study by Desor (1972) to assess perception of crowdedness. She has used this task to determine the degree to which an individual's criterion of what constitutes crowded is affected by architectural features such as windows, doors, partitions, and room shape and size. The task requires the subject to place small figures in an enclosure representing a room. He is instructed to place figures in the enclosure until he feels that placing additional figures would make the enclosure crowded. The number of figures placed in the enclosure is taken as a measure of the individual's criterion of what constititutes crowding in that particular environment. We have employed this task at the FCI to determine if an inmate's criterion of what is crowded is related to the degree of crowding in his housing environment.

Data from 44 inmates was obtained on the Desor task. The inmates were

asked to place the figures in the enclosure with the instructions to imagine that the figures represented people and that the enclosure was a living quarter. They were asked to assume beds for each figure placed in the enclosure. The inmates were run in groups of five in a large room at separate stations. It was found that both spatial and social density were positively correlated with figure placement. (social, $r = .32$, $df = 41$, p .05; spatial, $r = .25$, $df = 41$, $p =$ .10). Thus the higher the level of crowding, the greater the tolerance for crowding, especially for social density.

In addition, one might expect that tolerance for crowding would increase with the number of days of confinement in a particular housing unit. This possibility was assessed by multiplying the social and spatial density scores with the number of days in the inmates had lived under their respective conditions of housing and correlating the resulting scores with the figure placement scores. The resulting correlations were greater in magnitude for both social and spatial density than the correlations with the unadjusted scores. (social $r = .58$, $df = 37$, p .001; spatial, $r = .32$, $df = 37$, p .05). However, since these social and spatial density scores were significantly correlatied with one another, ($r = .55$, $df = 37$, p .001) a partial correlational analysis was done to assess the degree to which social and spatial density scores independently contributed to figure placement. While the relationship of the social density scores to figure placement remained practically unchanged, ($r = .51$) the correlation of spatial density to figure placement went to zero.

In sum, the figure placement data suggest that individuals living under relatively high levels of social density develop greater tolerance for crowding than those living under lower levels of social density. This finding is

in agreement with an adaptation level theory analysis of responsivity to stress.

It must be pointed out that the findings with the Desor task were not replicated in a second testing session which occurred after the initial submission of this paper. However, the conditions of this second session were less optimal for this task than that of the earlier session. For example, certain aspects of the procedure and instructions were published in the prison newspaper. This information may have provided the inmates an opportunity for developing preliminary sets or biases toward the task. Futhermore, during this session, the Desor task was only one of a series of tasks for each inmate. Previously it was the primary task and hence the inmates may have been more conscientious about the task at that time. We are going to attempt a careful repetition of this test under conditions similar to those of the first session this coming summer. However, the fact that the Desor task and the palmar sweat results both point to social density as the more important crowding variable further increases our confidence in the validity of the first session data. In any case, we feel that the Desor task provides a convenient and potentially useful technique for assessment of changes in the criterion of crowding as a function of conditions of crowding. It is important to have an indicant of this criterion since it may explain the failure to find stress effects in some situations or their moderation by increased exposure time in other cases. For example the failure to find stress-like effects of social or spatial density on the adjective checklist and illness rate measures may simply reflect the fact that the stress levels produced by the levels of crowding found in prisons are not strong enough to lead to inmate awareness of stress (on the adjective checklist) and consequently may fail to produce

psychosomatic symptoms. This could be due to a partial adaptation effect, or to the fact that the crowding stimuli at Texarkana are not very intense, or both. Evidence for psychosomatic illness due to stress generally comes from studies in which the stressful stimuli were very salient and frequently short-term events such as onset of surgery, a bombing flight, or the death of a loved one. Such events may not allow for the occurrence of an adaptation phenomenon.

Obviously these notions are highly speculative, but hopefully further research on crowding and other stressors can shed some light on these questions. For example in the Dallas County Jail most inmates are confined under much more highly corwded conditions than found at Texarkana. Under these conditions the crowding stimuli may be intense enough to lead to an enhancement in the occurrence of psychosomatic illness.

REFERENCES

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